

## SEQUENCE LISTING

<110> Aventis Pharma SA

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<120> NUCLEIC ACIDS OF THE HUMAN ABCA12 GENE, VECTORS CONTAINING SUCH NUCLEIC ACIDS, AND USES THEREOF

<130> 03806.0537

<150> US 60/267,715

<151> 2001-02-12

<160> 38

<170> PatentIn version 3.0

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<211> 2595

<212> PRT

<213> Homo sapiens

<220>

<221> Xaa

<222> (1)..(2595)

<223> Xaa = any amino acid

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Pro Val Ile Ile Phe Ile Ile Leu Ala Ile Thr Arg Thr Lys Phe Pro  
35 40 45  
Pro Thr Ala Lys Pro Thr Cys Tyr Leu Ala Pro Arg Asn Leu Pro Ser  
50 55 60  
Thr Gly Phe Phe Pro Phe Leu Gln Thr Leu Leu Cys Asp Thr Asp Ser  
65 70 75 80  
Lys Cys Lys Asp Thr Pro Tyr Gly Pro Gln Asp Leu Leu Arg Arg Lys  
85 90 95  
Gly Ile Asp Asp Ala Leu Phe Lys Asp Ser Glu Ile Leu Arg Lys Ser  
100 105 110  
Ser Asn Leu Asp Lys Asp Ser Ser Leu Ser Phe Gln Ser Thr Gln Val  
115 120 125  
Pro Glu Arg Arg His Ala Ser Leu Ala Thr Val Phe Pro Ser Pro Ser  
130 135 140  
Ser Asp Leu Glu Ile Pro Gly Thr Tyr Thr Phe Asn Gly Ser Gln Val  
145 150 155 160  
Leu Ala Arg Ile Leu Gly Leu Glu Lys Leu Leu Lys Gln Asn Ser Thr  
165 170 175  
Ser Glu Asp Ile Arg Arg Glu Leu Cys Asp Ser Tyr Ser Gly Tyr Ile  
180 185 190  
Val Asp Asp Ala Phe Ser Trp Thr Phe Leu Gly Arg Asn Val Phe Asn  
195 200 205  
Lys Phe Cys Leu Ser Asn Met Thr Leu Leu Glu Ser Ser Leu Gln Glu  
210 215 220  
Leu Asn Lys Gln Phe Ser Gln Leu Ser Ser Asp Pro Asn Asn Gln Lys  
225 230 235 240  
Ile Val Phe Gln Glu Ile Val Arg Met Leu Ser Phe Phe Ser Gln Val  
245 250 255  
Gln Glu Gln Lys Ala Val Trp Gln Leu Leu Ser Ser Phe Pro Asn Val  
260 265 270  
Phe Gln Asn Asp Thr Ser Leu Ser Asn Leu Phe Asp Val Leu Arg Lys  
275 280 285  
Ala Asn Ser Val Leu Leu Val Val Gln Lys Val Tyr Pro Arg Phe Ala  
290 295 300

Thr Asn Glu Gly Phe Arg Thr Leu Gln Lys Ser Val Lys His Leu Leu  
 305 310 315 320  
 Tyr Thr Leu Asp Ser Pro Ala Gln Gly Asp Ser Asp Asn Ile Thr His  
 325 330 335  
 Val Trp Asn Glu Asp Asp Gly Gln Thr Leu Ser Pro Ser Ser Leu Ala  
 340 345 350  
 Ala Gln Leu Leu Ile Leu Glu Asn Phe Glu Asp Ala Leu Leu Asn Ile  
 355 360 365  
 Ser Ala Asn Ser Pro Tyr Ile Pro Tyr Leu Ala Cys Val Arg Asn Val  
 370 375 380  
 Thr Asp Ser Leu Ala Arg Gly Ser Pro Glu Asn Leu Arg Leu Leu Gln  
 385 390 395 400  
 Ser Thr Ile Arg Phe Lys Lys Ser Phe Leu Arg Asn Gly Ser Tyr Glu  
 405 410 415  
 Asp Tyr Phe Pro Pro Val Pro Glu Val Leu Lys Ser Lys Leu Ser Gln  
 420 425 430  
 Leu Arg Asn Leu Thr Glu Leu Leu Cys Glu Ser Glu Thr Phe Ser Leu  
 435 440 445  
 Ile Glu Lys Ser Cys Gln Leu Ser Asp Met Ser Phe Gly Ser Leu Cys  
 450 455 460  
 Glu Glu Ser Glu Phe Asp Leu Gln Leu Leu Glu Ala Ala Glu Leu Gly  
 465 470 475 480  
 Thr Glu Ile Ala Ala Ser Leu Leu Tyr His Asp Asn Val Ile Ser Lys  
 485 490 495  
 Lys Val Arg Asp Leu Leu Thr Gly Asp Pro Ser Lys Ile Asn Leu Asn  
 500 505 510  
 Met Asp Gln Phe Leu Glu Gln Ala Leu Gln Met Asn Tyr Leu Glu Asn  
 515 520 525  
 Ile Thr Gln Leu Ile Pro Ile Ile Glu Ala Met Leu His Val Asn Asn  
 530 535 540  
 Ser Ala Asp Ala Ser Glu Lys Pro Gly Gln Leu Leu Glu Met Phe Lys  
 545 550 555 560  
 Asn Val Glu Glu Leu Lys Glu Asp Leu Arg Arg Thr Thr Gly Met Ser  
 565 570 575  
 Asn Arg Thr Ile Asp Lys Leu Leu Ala Ile Pro Ile Pro Asp Asn Arg  
 580 585 590  
 Ala Glu Ile Ile Ser Gln Val Phe Trp Leu His Ser Cys Asp Thr Asn  
 595 600 605  
 Ile Thr Thr Pro Lys Leu Glu Asp Ala Met Lys Glu Phe Cys Asn Leu  
 610 615 620  
 Ser Leu Ser Glu Arg Ser Arg Gln Ser Tyr Leu Ile Gly Leu Thr Leu  
 625 630 635 640  
 Leu His Tyr Leu Asn Ile Tyr Asn Phe Thr Asp Lys Val Phe Phe Pro  
 22



Gln Thr	Thr Arg Ser Leu Arg Thr	Lys Ile Trp Ala Pro	Gly Pro His
	995	1000	1005
Asn Ser	Pro Ser His Asn Gln	Ile Tyr Gly Arg Ala	Phe Ile Tyr
1010		1015	1020
Leu Gln	Asp Ser Ile Glu Arg	Ala Ile Ile Glu Leu	Gln Thr Gly
1025		1030	1035
Arg Asn	Ser Gln Glu Ile Ala	Val Gln Val Gln Ala	Ile Pro Tyr
1040		1045	1050
Pro Cys	Phe Met Lys Asp Asn	Phe Leu Thr Ser Val	Ser Tyr Ser
1055		1060	1065
Leu Pro	Ile Val Leu Met Val	Ala Trp Val Val Phe	Ile Ala Ala
1070		1075	1080
Phe Val	Lys Lys Leu Val Tyr	Glu Lys Asp Leu Arg	Leu His Glu
1085		1090	1095
Tyr Met	Lys Met Met Gly Val	Asn Ser Cys Ser His	Phe Phe Ala
1100		1105	1110
Trp Leu	Ile Glu Ser Val Gly	Phe Leu Leu Val Thr	Ile Val Ile
1115		1120	1125
Leu Ile	Ile Ile Leu Lys Phe	Gly Asn Ile Leu Pro	Lys Thr Asn
1130		1135	1140
Gly Phe	Ile Leu Phe Leu Tyr	Phe Ser Asp Tyr Ser	Phe Ser Val
1145		1150	1155
Ile Ala	Met Ser Tyr Leu Ile	Ser Val Phe Phe Asn	Asn Thr Asn
1160		1165	1170
Ile Ala	Ala Leu Ile Gly Ser	Leu Ile Tyr Ile Ile	Ala Phe Phe
1175		1180	1185
Pro Phe	Ile Val Leu Val Thr	Val Glu Asn Glu Leu	Ser Tyr Val
1190		1195	1200
Leu Lys	Val Phe Met Ser Leu	Leu Ser Pro Thr Ala	Phe Ser Tyr
1205		1210	1215
Ala Ser	Gln Tyr Ile Ala Arg	Tyr Glu Glu Gln Gly	Ile Gly Leu
1220		1225	1230
Gln Trp	Glu Asn Met Tyr Thr	Ser Pro Val Gln Asp	Asp Thr Thr
1235		1240	1245
Ser Phe	Gly Trp Leu Cys Cys	Leu Ile Leu Ala Asp	Ser Phe Ile
1250		1255	1260
Tyr Phe	Leu Ile Ala Trp Tyr	Val Arg Asn Val Phe	Pro Gly Thr
1265		1270	1275
Tyr Gly	Met Ala Ala Pro Trp	Tyr Phe Pro Ile Leu	Pro Ser Tyr
1280		1285	1290
Trp Lys	Glu Arg Phe Gly Cys	Ala Glu Val Lys Pro	Glu Lys Ser
1295		1300	1305



Asn Gly 1310	Leu Met Phe Thr	Asn Ile Met Met Gln 1315	Asn Thr Asn Pro 1320
Ser Ala 1325	Ser Pro Glu Tyr	Met Phe Ser Ser Asn 1330	Ile Glu Pro Glu 1335
Pro Lys 1340	Asp Leu Thr Val	Gly Val Ala Leu His 1345	Gly Val Thr Lys 1350
Ile Tyr 1355	Gly Ser Lys Val	Ala Val Asp Asn Leu 1360	Asn Leu Asn Phe 1365
Tyr Glu 1370	Gly His Ile Thr	Ser Leu Leu Gly Pro 1375	Asn Gly Ala Gly 1380
Lys Thr 1385	Thr Thr Ile Ser	Met Leu Thr Gly Leu 1390	Phe Gly Ala Ser 1395
Ala Gly 1400	Thr Ile Phe Val	Tyr Gly Lys Asp Ile 1405	Lys Thr Asp Leu 1410
His Thr 1415	Val Arg Lys Asn	Met Gly Val Cys Met 1420	Gln His Asp Val 1425
Leu Phe 1430	Ser Tyr Leu Thr	Thr Lys Glu His Leu 1435	Leu Leu Tyr Gly 1440
Ser Ile 1445	Lys Val Pro His	Trp Thr Lys Lys Gln 1450	Leu His Glu Glu 1455
Val Lys 1460	Arg Thr Leu Lys	Asp Thr Gly Leu Tyr 1465	Ser His Arg His 1470
Lys Arg 1475	Val Gly Thr Leu	Ser Gly Gly Met Lys 1480	Arg Lys Leu Ser 1485
Ile Ser 1490	Ile Ala Leu Ile	Gly Gly Ser Arg Val 1495	Val Ile Leu Asp 1500
Glu Pro 1505	Ser Thr Gly Val	Asp Pro Cys Ser Arg 1510	Arg Ser Ile Trp 1515
Asp Val 1520	Ile Ser Lys Asn	Lys Thr Ala Arg Thr 1525	Ile Ile Leu Ser 1530
Thr His 1535	His Leu Asp Glu	Ala Glu Val Leu Ser 1540	Asp Arg Ile Ala 1545
Phe Leu 1550	Glu Gln Gly Gly	Leu Arg Cys Cys Gly 1555	Ser Pro Phe Tyr 1560
Leu Lys 1565	Glu Ala Phe Gly	Asp Gly Tyr His Leu 1570	Thr Leu Thr Lys 1575
Lys Lys 1580	Ser Pro Asn Leu	Asn Ala Asn Ala Val 1585	Cys Asp Thr Met 1590
Ala Val 1595	Thr Ala Met Ile	Gln Ser His Leu Pro 1600	Glu Ala Tyr Leu 1605
Lys Glu 1610	Asp Ile Gly Gly	Glu Leu Val Tyr Val 1615	Leu Pro Pro Phe 1620
Ser Thr	Lys Val Ser Gly Ala	Tyr Leu Ser Leu Leu	Arg Ala Leu

1625	1630	1635
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Asp Thr Thr Val Glu Glu 1655	Val Phe Leu Asn Leu 1660	Thr Lys Glu Ser 1665
Gln Lys Asn Ser Ala Met 1670	Ser Leu Glu His Leu 1675	Thr Gln Lys Lys 1680
Ile Gly Asn Ser Asn Ala 1685	Asn Gly Ile Ser Thr 1690	Pro Asp Asp Leu 1695
Ser Val Ser Ser Ser Asn 1700	Phe Thr Asp Arg Asp 1705	Asp Lys Ile Leu 1710
Thr Arg Gly Glu Arg Leu 1715	Asp Gly Phe Gly Leu 1720	Leu Leu Lys Lys 1725
Ile Met Ala Ile Leu Ile 1730	Lys Arg Phe His His 1735	Xaa Arg Arg Asn 1740
Trp Lys Gly Leu Ile Ala 1745	Gln Val Ile Leu Pro 1750	Ile Val Phe Val 1755
Thr Thr Ala Met Gly Leu 1760	Gly Thr Leu Arg Asn 1765	Ser Ser Asn Ser 1770
Tyr Pro Glu Ile Gln Ile 1775	Ser Pro Ser Leu Tyr 1780	Gly Thr Ser Glu 1785
Gln Thr Ala Phe Tyr Ala 1790	Asn Tyr His Pro Ser 1795	Thr Glu Ala Leu 1800
Val Ser Ala Met Trp Asp 1805	Phe Pro Gly Ile Asp 1810	Asn Met Cys Leu 1815
Asn Thr Ser Asp Leu Gln 1820	Cys Leu Asn Lys Asp 1825	Ser Leu Glu Lys 1830
Trp Asn Thr Ser Gly Glu 1835	Pro Ile Thr Asn Phe 1840	Gly Val Cys Ser 1845
Cys Ser Glu Asn Val Gln 1850	Glu Cys Pro Lys Phe 1855	Asn Tyr Ser Pro 1860
Pro His Arg Arg Thr Tyr 1865	Ser Ser Gln Val Ile 1870	Tyr Asn Leu Thr 1875
Gly Gln Arg Val Glu Asn 1880	Tyr Leu Ile Ser Thr 1885	Ala Asn Glu Phe 1890
Val Gln Lys Arg Tyr Gly 1895	Gly Trp Ser Phe Gly 1900	Leu Pro Leu Thr 1905
Lys Asp Leu Arg Phe Asp 1910	Ile Thr Gly Val Pro 1915	Ala Asn Arg Thr 1920
Leu Ala Lys Val Trp Tyr 1925	Asp Pro Glu Gly Tyr 1930	His Ser Leu Pro 1935
Ala Tyr Leu Asn Ser Leu 1940	Asn Asn Phe Leu Leu 1945	Arg Val Asn Met 1950

Ser	Lys	Tyr	Asp	Ala	Ala	Arg	His	Gly	Ile	Ile	Met	Tyr	Ser	His
1955						1960					1965			
Pro	Tyr	Pro	Gly	Val	Gln	Asp	Gln	Glu	Gln	Ala	Thr	Ile	Ser	Ser
1970						1975					1980			
Leu	Ile	Asp	Ile	Leu	Val	Ala	Leu	Ser	Ile	Leu	Met	Gly	Tyr	Ser
1985						1990					1995			
Val	Thr	Thr	Ala	Ser	Phe	Val	Thr	Tyr	Val	Val	Arg	Glu	His	Gln
2000						2005					2010			
Thr	Lys	Ala	Lys	Gln	Leu	Gln	His	Ile	Ser	Gly	Ile	Gly	Val	Thr
2015						2020					2025			
Cys	Tyr	Trp	Val	Thr	Asn	Phe	Ile	Tyr	Asp	Met	Val	Phe	Tyr	Leu
2030						2035					2040			
Val	Pro	Val	Ala	Phe	Ser	Ile	Gly	Ile	Ile	Ala	Ile	Phe	Lys	Leu
2045						2050					2055			
Pro	Ala	Phe	Tyr	Ser	Glu	Asn	Asn	Leu	Gly	Ala	Val	Ser	Leu	Leu
2060						2065					2070			
Leu	Leu	Leu	Phe	Gly	His	Ala	Thr	Phe	Ser	Trp	Met	Tyr	Leu	Leu
2075						2080					2085			
Ala	Gly	Leu	Phe	His	Glu	Thr	Gly	Met	Ala	Phe	Ile	Thr	Tyr	Val
2090						2095					2100			
Cys	Val	Asn	Leu	Phe	Phe	Gly	Ile	Asn	Ser	Ile	Val	Ser	Leu	Ser
2105						2110					2115			
Val	Val	Tyr	Phe	Leu	Ser	Lys	Glu	Lys	Pro	Asn	Asp	Pro	Thr	Leu
2120						2125					2130			
Glu	Leu	Ile	Ser	Glu	Thr	Leu	Lys	Arg	Ile	Phe	Leu	Ile	Phe	Pro
2135						2140					2145			
Gln	Phe	Cys	Phe	Gly	Tyr	Gly	Leu	Ile	Glu	Leu	Ser	Gln	Gln	Gln
2150						2155					2160			
Ser	Val	Leu	Asp	Phe	Leu	Lys	Ala	Tyr	Gly	Val	Glu	Tyr	Pro	Asn
2165						2170					2175			
Glu	Thr	Phe	Glu	Met	Asn	Lys	Leu	Gly	Ala	Met	Phe	Val	Ala	Leu
2180						2185					2190			
Val	Ser	Gln	Gly	Thr	Met	Phe	Phe	Ser	Leu	Arg	Leu	Leu	Ile	Asn
2195						2200					2205			
Glu	Ser	Leu	Ile	Lys	Lys	Leu	Arg	Leu	Phe	Phe	Arg	Lys	Phe	Asn
2210						2215					2220			
Ser	Ser	His	Val	Arg	Glu	Thr	Ile	Asp	Glu	Asp	Glu	Asp	Val	Arg
2225						2230					2235			
Ala	Glu	Arg	Leu	Arg	Val	Glu	Ser	Gly	Ala	Ala	Glu	Phe	Asp	Leu
2240						2245					2250			
Val	Gln	Leu	Tyr	Cys	Leu	Thr	Lys	Thr	Tyr	Gln	Leu	Ile	His	Lys
2255						2260					2265			

Lys	Ile	Ile	Ala	Val	Asn	Asn	Ile	Ser	Ile	Gly	Ile	Pro	Ala	Gly
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Glu	Cys	Phe	Gly	Leu	Leu	Gly	Val	Asn	Gly	Ala	Gly	Lys	Thr	Thr
	2285					2290					2295			
Ile	Phe	Lys	Met	Leu	Thr	Gly	Asp	Ile	Ile	Pro	Ser	Ser	Gly	Asn
	2300					2305					2310			
Ile	Leu	Ile	Arg	Asn	Lys	Thr	Gly	Ser	Leu	Gly	His	Val	Asp	Ser
	2315					2320					2325			
His	Ser	Ser	Leu	Val	Gly	Tyr	Cys	Pro	Gln	Glu	Asp	Ala	Leu	Asp
	2330					2335					2340			
Asp	Leu	Val	Thr	Val	Glu	Glu	His	Leu	Tyr	Phe	Tyr	Ala	Arg	Val
	2345					2350					2355			
His	Gly	Ile	Pro	Glu	Lys	Asp	Ile	Lys	Glu	Thr	Val	His	Lys	Leu
	2360					2365					2370			
Leu	Arg	Arg	Leu	His	Leu	Met	Pro	Phe	Lys	Asp	Arg	Ala	Thr	Ser
	2375					2380					2385			
Met	Cys	Ser	Tyr	Gly	Thr	Lys	Arg	Lys	Leu	Ser	Thr	Ala	Leu	Ala
	2390					2395					2400			
Leu	Ile	Gly	Lys	Pro	Ser	Ile	Leu	Leu	Leu	Asp	Glu	Pro	Ser	Ser
	2405					2410					2415			
Gly	Met	Asp	Pro	Lys	Ser	Lys	Arg	His	Leu	Trp	Lys	Ile	Ile	Ser
	2420					2425					2430			
Glu	Glu	Val	Gln	Asn	Lys	Cys	Ser	Val	Ile	Leu	Thr	Ser	His	Ser
	2435					2440					2445			
Met	Glu	Glu	Cys	Glu	Ala	Leu	Cys	Thr	Arg	Leu	Ala	Ile	Met	Val
	2450					2455					2460			
Asn	Gly	Lys	Phe	Gln	Cys	Ile	Gly	Ser	Leu	Gln	His	Ile	Lys	Ser
	2465					2470					2475			
Arg	Phe	Gly	Arg	Gly	Phe	Thr	Val	Lys	Val	His	Leu	Lys	Asn	Asn
	2480					2485					2490			
Lys	Val	Thr	Met	Glu	Thr	Leu	Thr	Lys	Phe	Met	Gln	Leu	His	Phe
	2495					2500					2505			
Pro	Lys	Thr	Tyr	Leu	Lys	Asp	Gln	His	Leu	Ser	Met	Leu	Glu	Tyr
	2510					2515					2520			
His	Val	Pro	Val	Thr	Ala	Gly	Gly	Val	Ala	Asn	Ile	Phe	Asp	Leu
	2525					2530					2535			
Leu	Glu	Thr	Asn	Lys	Thr	Ala	Leu	Asn	Ile	Thr	Asn	Phe	Leu	Val
	2540					2545					2550			
Ser	Gln	Thr	Thr	Leu	Glu	Glu	Val	Phe	Ile	Asn	Phe	Ala	Lys	Asp
	2555					2560					2565			
Gln	Lys	Ser	Tyr	Glu	Thr	Ala	Asp	Thr	Ser	Ser	Gln	Gly	Ser	Thr
	2570					2575					2580			
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2585

2590

2595

&lt;210&gt; 6

&lt;211&gt; 2516

&lt;212&gt; PRT

&lt;213&gt; Homo sapiens

&lt;220&gt;

&lt;221&gt; Xaa

&lt;222&gt; (1)..(2516)

&lt;223&gt; Xaa = any amino acid

&lt;400&gt; 6

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20 25 30Pro Val Ile Ile Phe Ile Ile Leu Ala Ile Thr Arg Thr Lys Phe Pro  
35 40 45Pro Thr Ala Lys Pro Thr Cys Tyr Leu Ala Pro Arg Asn Leu Pro Ser  
50 55 60Thr Gly Phe Phe Pro Phe Leu Gln Thr Leu Leu Cys Asp Thr Asp Ser  
65 70 75 80Lys Cys Lys Asp Thr Pro Tyr Gly Pro Gln Asp Leu Leu Arg Arg Lys  
85 90 95Gly Ile Asp Asp Ala Leu Phe Lys Asp Ser Glu Ile Leu Arg Lys Ser  
100 105 110Ser Asn Leu Asp Lys Asp Ser Ser Leu Ser Phe Gln Ser Thr Gln Val  
115 120 125Pro Glu Arg Arg His Ala Ser Leu Ala Thr Val Phe Pro Ser Pro Ser  
130 135 140Ser Asp Leu Glu Ile Pro Gly Thr Tyr Thr Phe Asn Gly Ser Gln Val  
145 150 155 160Leu Ala Arg Ile Leu Gly Leu Glu Lys Leu Leu Lys Gln Asn Ser Thr  
165 170 175Ser Glu Asp Ile Arg Arg Glu Leu Cys Asp Ser Tyr Ser Gly Tyr Ile  
180 185 190Val Asp Asp Ala Phe Ser Trp Thr Phe Leu Gly Arg Asn Val Phe Asn  
195 200 205Lys Phe Cys Leu Ser Asn Met Thr Leu Leu Glu Ser Ser Leu Gln Glu  
209

210

215

220

Leu Asn Lys Gln Phe Ser Gln Leu Ser Ser Asp Pro Asn Asn Gln Lys  
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Ile Val Phe Gln Glu Ile Val Arg Met Leu Ser Phe Phe Ser Gln Val  
 245 250 255

Gln Glu Gln Lys Ala Val Trp Gln Leu Leu Ser Ser Phe Pro Asn Val  
 260 265 270

Phe Gln Asn Asp Thr Ser Leu Ser Asn Leu Phe Asp Val Leu Arg Lys  
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Ala Asn Ser Val Leu Leu Val Val Gln Lys Val Tyr Pro Arg Phe Ala  
 290 295 300

Thr Asn Glu Gly Phe Arg Thr Leu Gln Lys Ser Val Lys His Leu Leu  
 305 310 315 320

Tyr Thr Leu Asp Ser Pro Ala Gln Gly Asp Ser Asp Asn Ile Thr His  
 325 330 335

Val Trp Asn Glu Asp Asp Gly Gln Thr Leu Ser Pro Ser Ser Leu Ala  
 340 345 350

Ala Gln Leu Leu Ile Leu Glu Asn Phe Glu Asp Ala Leu Leu Asn Ile  
 355 360 365

Ser Ala Asn Ser Pro Tyr Ile Pro Tyr Leu Ala Cys Val Arg Asn Val  
 370 375 380

Thr Asp Ser Leu Ala Arg Gly Ser Pro Glu Asn Leu Arg Leu Leu Gln  
 385 390 395 400

Ser Thr Ile Arg Phe Lys Lys Ser Phe Leu Arg Asn Gly Ser Tyr Glu  
 405 410 415

Asp Tyr Phe Pro Pro Val Pro Glu Val Leu Lys Ser Lys Leu Ser Gln  
 420 425 430

Leu Arg Asn Leu Thr Glu Leu Leu Cys Glu Ser Glu Thr Phe Ser Leu  
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Ile Glu Lys Ser Cys Gln Leu Ser Asp Met Ser Phe Gly Ser Leu Cys  
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Glu Glu Ser Glu Phe Asp Leu Gln Leu Leu Glu Ala Ala Glu Leu Gly  
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Thr Glu Ile Ala Ala Ser Leu Leu Tyr His Asp Asn Val Ile Ser Lys  
 485 490 495

Lys Val Arg Asp Leu Leu Thr Gly Asp Pro Ser Lys Ile Asn Leu Asn  
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Met Asp Gln Phe Leu Glu Gln Ala Leu Gln Met Asn Tyr Leu Glu Asn  
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Ile Thr Gln Leu Ile Pro Ile Ile Glu Ala Met Leu His Val Asn Asn  
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Ser Ala Asp Ala Ser Glu Lys Pro Gly Gln Leu Leu Glu Met Phe Lys  
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Asn Val Glu Glu Leu Lys Glu Asp Leu Arg Arg Thr Thr Gly Met Ser  
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 Ser Leu Ser Glu Arg Ser Arg Gln Ser Tyr Leu Ile Gly Leu Thr Leu  
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 Leu His Tyr Leu Asn Ile Tyr Asn Phe Thr Asp Lys Val Phe Phe Pro  
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 Asp Lys Met Arg Ser Leu Lys Gln Met His Leu Pro Arg Ser Val Pro  
 690 695 700  
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 Ser Phe Ser Thr Ile Ser Gln Ala Leu Cys Ser Gln Gly Ile Thr Thr  
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 Glu Tyr Leu Thr Ala Met Leu Pro Ser Ser Gln Arg Pro Lys Gly Asn  
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 His Thr Lys Asp Phe Leu Thr Tyr Lys Leu Thr Lys Glu Gln Ile Ala  
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 Ser Lys Tyr Gly Ile Pro Ile Asn Thr Thr Pro Phe Cys Phe Ser Leu  
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 Tyr Lys Asp Ile Ile Asn Met Pro Ala Gly Pro Val Ile Trp Ala Phe  
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Arg Leu Tyr Lys Ser Asn Glu Leu Phe Gly Ser Val Ile Phe Lys Leu  
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Pro Ser Asn Arg Ser Trp His Arg Gly Tyr Asp Ser Gly Asn Val Phe  
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Leu Pro Pro Val Ile Lys Tyr Thr Ile Arg Met Ser Leu Lys Thr Ala  
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Asn Ser Pro Ser His Asn Gln Ile Tyr Gly Arg Ala Phe Ile Tyr  
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Tyr Met Lys Met Met Gly Val Asn Ser Cys Ser His Phe Phe Ala  
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Pro Phe Ile Val Leu Val Thr Val Glu Asn Glu Leu Ser Tyr Val  
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Ala Ser Gln Tyr Ile Ala Arg Tyr Glu Glu Gln Gly Ile Gly Leu  
32



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Lys	Thr	Thr	Thr	Ile	Ser	Met	Leu	Thr	Gly	Leu	Phe	Gly	Ala	Ser
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Ala	Gly	Thr	Ile	Phe	Val	Tyr	Gly	Lys	Asp	Ile	Lys	Thr	Asp	Leu
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His	Thr	Val	Arg	Lys	Asn	Met	Gly	Val	Cys	Met	Gln	His	Asp	Val
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Leu	Phe	Ser	Tyr	Leu	Thr	Thr	Lys	Glu	His	Leu	Leu	Leu	Tyr	Gly
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Ser	Ile	Lys	Val	Pro	His	Trp	Thr	Lys	Lys	Gln	Leu	His	Glu	Glu
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Val	Lys	Arg	Thr	Leu	Lys	Asp	Thr	Gly	Leu	Tyr	Ser	His	Arg	His
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Thr	His	His	Leu	Asp	Glu	Ala	Glu	Val	Leu	Ser	Asp	Arg	Ile	Ala
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Ser 1865	Leu	Asn	Asn	Phe	Leu	Leu 1870	Arg	Val	Asn	Met	Ser 1875	Lys	Tyr	Asp
Ala 1880	Ala	Arg	His	Gly	Ile	Ile 1885	Met	Tyr	Ser	His	Pro 1890	Tyr	Pro	Gly
Val 1895	Gln	Asp	Gln	Glu	Gln	Ala 1900	Thr	Ile	Ser	Ser	Leu 1905	Ile	Asp	Ile
Leu 1910	Val	Ala	Leu	Ser	Ile	Leu 1915	Met	Gly	Tyr	Ser	Val 1920	Thr	Thr	Ala
Ser 1925	Phe	Val	Thr	Tyr	Val	Val 1930	Arg	Glu	His	Gln	Thr 1935	Lys	Ala	Lys
Gln 1940	Leu	Gln	His	Ile	Ser	Gly 1945	Ile	Gly	Val	Thr	Cys 1950	Tyr	Trp	Val
Thr 1955	Asn	Phe	Ile	Tyr	Asp	Met 1960	Val	Phe	Tyr	Leu	Val 1965	Pro	Val	Ala
Phe 1970	Ser	Ile	Gly	Ile	Ile	Ala 1975	Ile	Phe	Lys	Leu	Pro 1980	Ala	Phe	Tyr
Ser 1985	Glu	Asn	Asn	Leu	Gly	Ala 1990	Val	Ser	Leu	Leu	Leu 1995	Leu	Leu	Phe
Gly 2000	His	Ala	Thr	Phe	Ser	Trp 2005	Met	Tyr	Leu	Leu	Ala 2010	Gly	Leu	Phe
His 2015	Glu	Thr	Gly	Met	Ala	Phe 2020	Ile	Thr	Tyr	Val	Cys 2025	Val	Asn	Leu
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Phe 2090	Leu	Lys	Ala	Tyr	Gly	Val 2095	Glu	Tyr	Pro	Asn	Glu 2100	Thr	Phe	Glu
Met 2105	Asn	Lys	Leu	Gly	Ala	Met 2110	Phe	Val	Ala	Leu	Val 2115	Ser	Gln	Gly
Thr 2120	Met	Phe	Phe	Ser	Leu	Arg 2125	Leu	Leu	Ile	Asn	Glu 2130	Ser	Leu	Ile
Lys 2135	Lys	Leu	Arg	Leu	Phe	Phe 2140	Arg	Lys	Phe	Asn	Ser 2145	Ser	His	Val
Arg 2150	Glu	Thr	Ile	Asp	Glu	Asp 2155	Glu	Asp	Val	Arg	Ala 2160	Glu	Arg	Leu
Arg 2165	Val	Glu	Ser	Gly	Ala	Ala 2170	Glu	Phe	Asp	Leu	Val 2175	Gln	Leu	Tyr
Cys 2180	Leu	Thr	Lys	Thr	Tyr	Gln	Leu	Ile	His	Lys	Lys	Ile	Ile	Ala

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Val Asn 2195	Asn Ile Ser Ile Gly 2200	Ile Pro Ala Gly Glu 2205
Leu Leu 2210	Gly Val Asn Gly Ala 2215	Gly Lys Thr Thr Ile 2220
Leu Thr 2225	Gly Asp Ile Ile Pro 2230	Ser Ser Gly Asn Ile 2235
Asn Lys 2240	Thr Gly Ser Leu Gly 2245	His Val Asp Ser His 2250
Val Gly 2255	Tyr Cys Pro Gln Glu 2260	Asp Ala Leu Asp Asp 2265
Val Glu 2270	Glu His Leu Tyr Phe 2275	Tyr Ala Arg Val His 2280
Glu Lys 2285	Asp Ile Lys Glu Thr 2290	Val His Lys Leu Leu 2295
His Leu 2300	Met Pro Phe Lys Asp 2305	Arg Ala Thr Ser Met 2310
Gly Thr 2315	Lys Arg Lys Leu Ser 2320	Thr Ala Leu Ala Leu 2325
Pro Ser 2330	Ile Leu Leu Leu Asp 2335	Glu Pro Ser Ser Gly 2340
Lys Ser 2345	Lys Arg His Leu Trp 2350	Lys Ile Ile Ser Glu 2355
Asn Lys 2360	Cys Ser Val Ile Leu 2365	Thr Ser His Ser Met 2370
Glu Ala 2375	Leu Cys Thr Arg Leu 2380	Ala Ile Met Val Asn 2385
Gln Cys 2390	Ile Gly Ser Leu Gln 2395	His Ile Lys Ser Arg 2400
Gly Phe 2405	Thr Val Lys Val His 2410	Leu Lys Asn Asn Lys 2415
Glu Thr 2420	Leu Thr Lys Phe Met 2425	Gln Leu His Phe Pro 2430
Leu Lys 2435	Asp Gln His Leu Ser 2440	Met Leu Glu Tyr His 2445
Thr Ala 2450	Gly Gly Val Ala Asn 2455	Ile Phe Asp Leu Leu 2460
Lys Thr 2465	Ala Leu Asn Ile Thr 2470	Asn Phe Leu Val Ser 2475
Leu Glu 2480	Glu Val Phe Ile Asn 2485	Phe Ala Lys Asp Gln 2490
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